

Charge Sharing and Clustering in Pixel Layer

Svx Software Meeting
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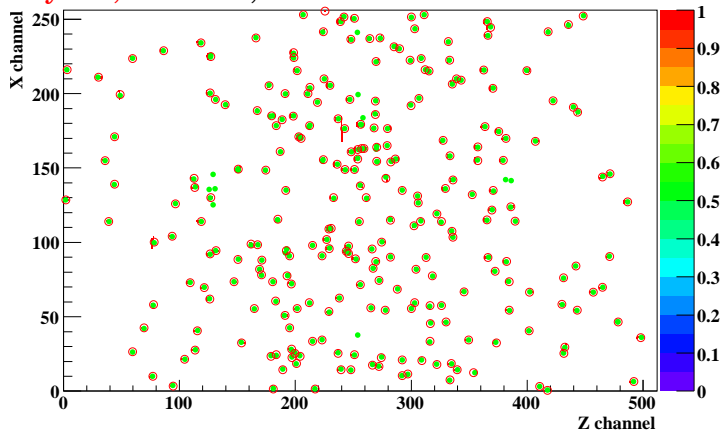
RIKEN

Updates since Feb. 09

- ▶ Fixed the problem that some GEANT hits have no associated clusters
 - ▷ two causes
 - ▷▷ one bug in code (hits across sensor edge were skipped)
 - ▷▷ one drawing problem (hits outside sensors were drawn)
 - ▷ now works fine (**see next slide**)
- ▶ It has been committed to PHENIX CVS
- ▶ To-do items (not critical to blind analysis)
 - ▷ properly set the cluster `size` field in pixel layer (now the ADC value of a cluster in pixel layer means the N of pixels grouped)
 - ▷ make a cluster *local*-size field as well as *global* one
 - ▷ other minor issues on strip/stripixel

Event display — I

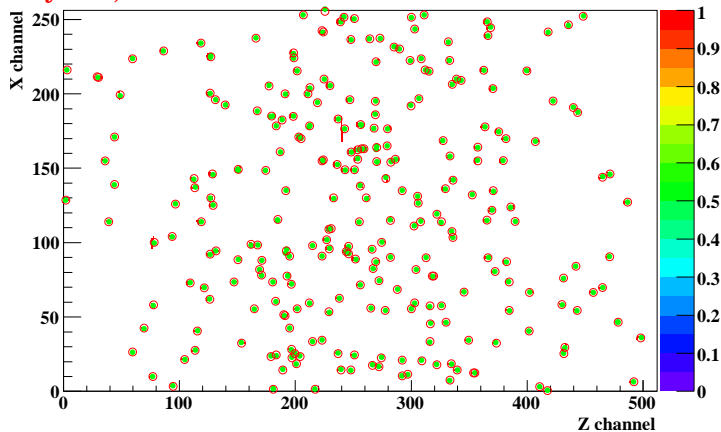
► Layer 0, Ladder 0, Before-Fix Version



21.8 cm width, 1.28 cm height / ●: GEANT hit, ○: cluster

Event display — II

► Layer 0, Ladder 0

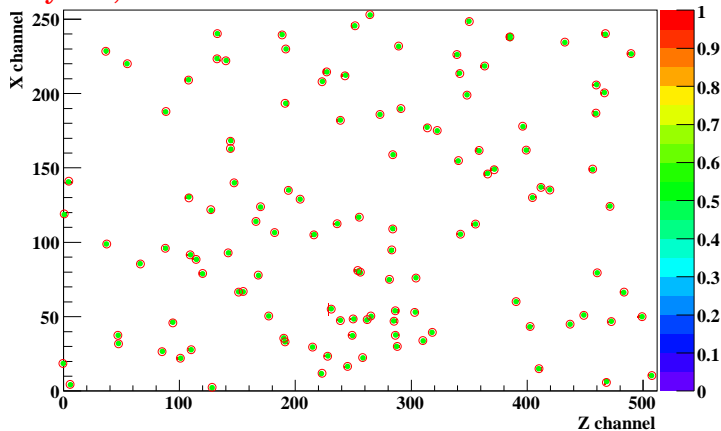


21.8 cm width, 1.28 cm height / ●: GEANT hit, ○: cluster

- double hit (for example at $(z_{ch}, x_{ch}) = (355, 15)$) is made by one GEANT hit on two neighboring sections

Event display — III

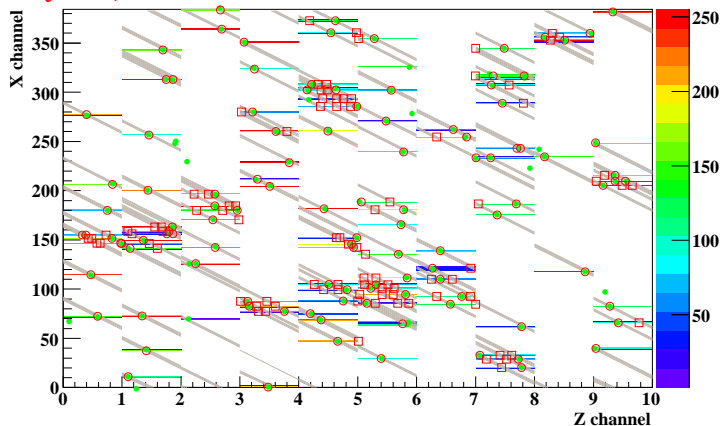
► Layer 1, Ladder 0



21.8 cm width, 1.28 cm height / ●: GEANT hit, ○: cluster

Event display — IV

► Layer 2, Ladder 0

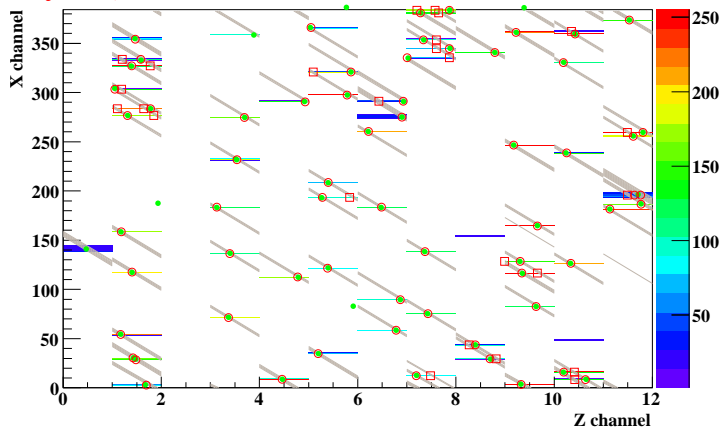


●: GEANT hit, ○: cluster, □: ghost cluster

▷ no cluster for some GEANT hits (probably low ADC)

Event display — V

► Layer 3, Ladder 0



●: GEANT hit, ○: cluster, □: ghost cluster

Backup Slides...

Charge Sharing and Clustering in Pixel Layer

► Charge sharing (Manabu's work)

- ▷ for each GEANT hit, charges are shared by the fraction of a path length in each pixel toward the total path length
- ▷ the effect of charge diffusion not yet considered
- ▷ (note) ADC = 0 or 1, no noise

► Clustering

- ▷ just gather fired pixels neighboring in x or z directions (8 pixels around a initial fired pixel are candidates)
- ▷ cluster position is just the mean value of pixel positions
- ▷ no clustering across sections
 - ▷▷ one pixel sensor consists of 7 sections (0 to 6)
 - ▷▷ sensors 0, 2, 4, 6 are under readout chips and consist of 30 or 31 pixels in z with $425\ \mu\text{m}$
 - ▷▷ sensors 1, 3, 5 are between readout chips and consist of 2 pixels in z with $625\ \mu\text{m}$